AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-44 (cancelled).

45 (currently amended). A bioreactor for the proliferation and growth of cells, the bioreactor comprising

a plurality of hollow fibres for containment of cells therein and formed from a semipermeable material that is permeable ~~is permeable~~ to at least one substance selected from the group consisting of a nutrient, a regulator and a metabolite but is substantially impermeable to at least one protein required for proliferation, differentiation and/or genetic modification, the hollow fibres being positioned within a housing defining an acellular space;

housing inlet and housing outlet means communicating through the acellular space to define an acellular flow path;

a liquid flow circuit providing fluid communication between the housing inlet and outlet means; and

circulation means associated with the liquid flow circuit to circulate media through the acellular space, the media being circulated by the circulation means at a rate ~~being~~ responsive to the ~~cell biomass~~oxygen uptake, metabolite uptake and/or lactate output of the cells.

46 (previously presented). A bioreactor according to claim 45 wherein the hollow fibres contain cells and at least one protein required for proliferation, differentiation

and/or genetic modification of the cells in the lumen thereof.

47 (previously presented). A bioreactor according to claim 45 wherein the acellular space contains media comprising at least one substance required for proliferation of the cells.

48 (previously presented). A bioreactor according to claim 47 wherein the at least one substance is selected from the group consisting of glucose, amino acids, vitamins, steroid hormones and mixtures of two or more thereof.

49 (previously presented). A bioreactor according to claim 45 wherein the hollow fibres are formed from a semi-permeable material selected from the group consisting of cellulose, cellulose acetate and polysulfone.

50 (previously presented). A bioreactor according to claim 49 wherein the semi-permeable material is cellulose.

51 (currently amended). A bioreactor according to claim 50 wherein the hollow fibres have a ~~diameter~~ radius of about 100 to 400 μm and a wall thickness in the range of about 6 to 50 μm.

52 (currently amended). A bioreactor according to claim 45 wherein the circulation means is at least one pump.

53-54 (cancelled).

55 (previously presented). A bioreactor according to claim 45 further comprising gas control means for controlling oxygen and carbon dioxide content of the acellular media.

56 (previously presented). A bioreactor according to claim 55 wherein the gas control means is gas exchange means.

57 (previously presented). A bioreactor according to claim 56 wherein the gas exchange means comprises a silicone membrane.

58 (previously presented). A bioreactor according to claim 57 wherein the gas exchange means is a silicone tube in fluid communication with the liquid flow circuit and passing through a gas chamber.

59 (previously presented). A bioreactor according to claim 45 further comprising means to control the temperature of media flowing in the liquid flow circuit.

60 (previously presented). A bioreactor according to claim 45 wherein the liquid flow circuit recycles the acellular media to the acellular space.

61 (previously presented). A method according to claim 45 further comprising means for replacing the acellular media with fresh media at a preselected rate.

62 (previously presented). A bioreactor according to claim 45 wherein the hollow fibres are provided internally with at least one ligand.

63 (previously presented). A bioreactor according to claim 62 wherein the ligand is selected from the group consisting of an antibody, lectin, growth factor and receptor.

64 (previously presented). A bioreactor according to claim 63 wherein the ligand is an antibody.

65 (previously presented). A bioreactor according to claim 64 wherein the ligand is a monoclonal antibody.

66 (previously presented). A bioreactor according to claim 45 wherein the cells are selected from the group consisting of animal cells, plant cells, fungi cells and microorganisms.

67 (previously presented). A bioreactor according to claim 66 wherein the cells are mammalian cells.

68 (previously presented). A bioreactor according to claim 67 wherein the cells are selected from the group consisting of haematopoietic cells (CD34+), T cells, B cells, dendritic cells, liver cells, bone marrow cells, pancreatic islet cells, embryonic stem cells or genetically modified cells such as chinese hamster ovary (CHO) cells and hybridomas.

69 (previously presented). A bioreactor according to claim 45 wherein the bioreactor is capable of both cell separation and cell culture.

70 (previously presented). A bioreactor according to claim 45 which is portable.